CONTEXT FOR MATHEMATICS PAPER 1 AND MATHEMATICS PAPER 2: AN ANALYSIS OF GRADE 12 MATHEMATICS PAPERS IN SOUTH AFRICA.

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Abstract

This is a mixed methods research on Grade 12 past examination mathematics contextual word problems. The research focused on implemented curriculum and assessment of learning by analysing the nature and quantity of contextual word problems asked in the FET mathematics examinations of IEB and those of NSC. It was revealed that past examination contextual word problems varies in terms of quantity, nature, theme and subject of context from Paper 1 to Paper 2, from one examination body to another and from one year to another. The theory of authentic task situations and the Realistic Mathematics Education (RME) perspectives were taken in this study.

1.1 Introduction.

Education always carries this contradictory aspect, it conveys the values and concerns of a given society at a point in time, but also holds the potential to go further than where that society is, to transcend the given and imagine the new, (Bloch, 2009). In South Africa, there are two different examinations for Grade 12 schools which follow the National Curriculum Statement (NCS). The first one is administered, largely for public schools, by the Department of Basic Education (DBE) and is called the National Senior Certificate (NSC). The second one is administered largely for private schools by the Independent Examinations Body (IEB) and is generally known as IEB.

There are three types of curriculum namely intended curriculum, implemented curriculum and attained curriculum. Intended curriculum is the mathematics content as it is defined in the curriculum documents which can be revealed in content analysis of curriculum documents. Since intended curriculum exists regardless of being experienced, it is physical. Implemented curriculum is the mathematics content as it is interpreted by teachers, subject advisors and examiners and made available to students which was revealed in content analysis of question papers. Since implemented curriculum is experienced, it is objective.

Attained curriculum is the outcomes of schooling which includes concepts, processes and attitudes towards mathematics that the student has acquired in the course of their education which was revealed in content analysis of examination reports. Since attained curriculum is expressed in the form of symbols, it is subjective.

Both IEB and NSC follow the National Curriculum Statement which states that context should be involved in mathematics teaching, learning and assessment. However, there is no specification on the nature of mathematization, significance, theme and subject of context for the contextual word problems. As a result the nature of contextual word problems in terms of mathematization, significance, themes and subject of context varies, from, one year to another, one examination body to another and Paper 1 to Paper 2 resulting in variations in implemented curriculum.

Variations in past examination results indicate that attained curriculum also varies from one year to another, one examination body to another and Paper 1 to Paper 2. There is need to determine the nature, if any of the relationship between variations in implemented curriculum in terms of the nature and quantity of contextual word problems in Grade 12 mathematics examinations and variations in attained curriculum as signified by Grade 12 results. Rather than providing explanations for the differences in the mathematics performance of IEB students and NSC students, there is need to provide suggestions about how to overcome and get past these differences.

1.2. Contextual word problems: As experienced by students.

Although an important purpose of mathematics in the Further Education and Training band is the establishment of proper connections between mathematics and the real world, contextual word problems in examinations are often barriers to some students because of poor literacy levels that usually prevent them from identifying the mathematical skills involved (Sasman, 2011).

Contextual word problems have been researched and found to be difficult by students (Onabanjo, 2004). The difficulties emanate from lack of ability, irrelevance of contextual word problems to student's lives, lack of motivation to solve contextual word problems and limited experience with contextual word problems (Bates and Wiest, 2004). Assessment in context is not always appropriate. Sometimes, the problem is not necessarily contextual word problems per se but inappropriate contextual word problems.

While some contextual word problems appear to be imbedded in real-life contexts, students are more likely to succeed if they suspend their knowledge of the real-life and what they know about how to approach the solution of real life mathematics problems (Cooper, 1992). Although it may be more suitable to teach in meaningful contexts, in the assessment of mathematics, pupils may not benefit from questions which are forced into so-called real contexts (Fischer-Hoch and Hughes, 1996).

Performance in contextual word problems is generally poor because students seldom make realistic considerations when applying real world knowledge to contextual word problems resulting in the display of what seems to be suspension of common sense when solving mathematics contextual word problems (Schoenfeld, 1991).

More often than not, students write non-realistic and logically inconsistent answers when attempting to solve contextual word problems. The major reason why students find contextual word problems difficult might be that real life problems are not appropriately mathematized in contextual word problems resulting in students not identifying the link between real life problems and contextual word problems.

Analysis of the data on the provincial average percentages obtained in each question in the 2010 NSC mathematics papers from the Western Cape Department of Education reveals that students perform poorly in contextual word problems. The provincial average percentage on contextual word problem number 7 was 22, 9%, on contextual word problem number 10, the provincial average was 15% and on contextual word problem number 11 the provincial average was 30% (Sasman, 2011).

Language also contributes to poor performance in contextual word problems in NSC schools. The language of teaching, learning and assessment is predominantly English. Most students learn mathematics in their first additional language whilst a few students learn mathematics in their home language (Third International Mathematics and Science Study (TIMSS), 1998). In the 1995 TIMSS and the 1999 TIMSS, 70% of South African students wrote achievement tests in their second or third language (Howie, 2003).

The 1999 TIMSS results revealed that South African students who spoke either English or Afrikaans at home achieved higher marks (about 100 points above the national average) than those who did not (Howie, 2003). However students who spoke other home languages at home scored only 20 points on average less than the first language speakers. On the other hand students speaking African languages at home attained 100 points less than the other group of second language speakers. The first two groups of students are more likely to write IEB examinations. The third group of students is more likely to write NSC examinations.

Home language speakers for whom English is nearly automatic can focus primarily on cognitive skills for an assessment task (Anstrom, 1998). On the other hand first additional language speakers learn mathematics as well as the language of teaching and learning. English language therefore tends to be a barrier to learning mathematics for many first additional language speakers (cf Umalusi Report, 2004).

This implies that English first language speakers will have an advantage over first additional language speakers where they may struggle to understand the mathematics embedded in words used in mathematics (Durkin and Shire, 1991). There is therefore a need to sufficiently take this into account when teaching mathematics and setting contextual word problems. Home language students could have had no problem understanding the language used in NSC 2009 Paper 2 but some questions would have been difficult for the rest of the students to understand particularly question 2.3, 2.4, 5.7 and 11.1 which used some unfamiliar words for example trend and bearing (AMESA Report, 2009)

It is possible to pursue equity through mathematics education by providing students with tools to critique and act upon issues of importance in their lives, in their communities, and for human kind in general (Gutstein, 2006). This can be achieved through realistic mathematics education whereby students rediscover mathematics by solving real world problems. Consequently, contextual word problems can be effectively employed to reduce inequalities in mathematics education and subsequently in society.

The main barrier to effective use of contextual word problems is that many teachers, textbook writers' and assessment developers are struggling with the development of more realistic mathematical school tasks that resemble out-of-school task situations (Palm, 2002). Contextual word problems are perceived as artificial, puzzle-like tasks that are unrelated to the real world (Verschaffel, 2006). The opportunity cost of exposing students to inappropriate contextual word problems might be a population of students in which the majority of them remain alienated from contextual word problems.

Many students have difficulty converting a contextual word problem into the necessary mathematical form when solving the problem (Hart, 1996). More often than not, students seem to be unable to create a mental representation that links the text of the word problem to appropriate mathematical expressions (Hart, 1996). To avoid this, mathematical contexts should function as realistic and authentic contexts inviting or even forcing students to use their common sense knowledge and experience about the real world in the different stages of solving contextual word problems.

Different students perform differently in contextual word problems. The difference in the performance of students in contextual word problems might be a reflection of inequalities in society. Improving the quality of primary schooling, particularly numeracy competence is a prerequisite to effective quality gains on a long term basis in secondary schooling, Further Education and Training, colleges and universities (Taylor, Fleisch and Shinder 2008).

Currently there are some components of education that are equity promoting such as the no-fee schools and the norms and standards programme , but funding for these appears too small to bridge the inequality gap. Additionally the within-province patterns of education spending observed by Fiske and Ladd (2005) in Western Cape and Motala (2006) in Gauteng where disproportionate amounts of education funding go into privileged schools shows that spending inequity is still prevalent.

Good passes in the National Senior Certificate mathematics examinations are important for higher education, skilled jobs and economic growth (Amesa, 2011). High levels of educational inequality had given rise to large earnings inequality (Van der Berg, 2007). The large earnings inequality of parents also gives rise to high levels of educational inequality to their children. There seems to be a vicious cycle of educational inequalities and earnings inequality which is largely driven by the labour market. The scarcity of skills within the South African economy has its foundation in an inadequate baseline of achievement within the public schooling system from the foundation phase.

Although there is a lot of research on schooling outcomes in South Africa, there seems to be no previous research which has analysed the mathematization of real life situations to form mathematics contextual word problems in the FET examinations of IEB and NSC. Thus it remains unclear as to what extent the nature of the mathematization of real life situations to form contextual word problems affects students' performance.

This research investigates the nature and cognitive demands of contextual word problems asked in the FET mathematics examinations of IEB and those of NSC, focusing on implemented curriculum and attained curriculum. Analysis of implemented curriculum will focus on the nature of the mathematization of real life situations to form contextual word problems asked in FET mathematics examinations of IEB and those of NSC using a concurrent triangulation mixed methods research design. Analysis of attained curriculum will be based on student performance in contextual word problems asked in the FET mathematics examinations of IEB and those of NSC.

1.2.1 Problem of study.

The study intends to compare the nature and cognitive requirements of contextual word problems asked in the FET mathematics examinations of IEB with those of the National Senior Certificate.

1.2.2 Research Questions.

(i) Are there any similarities between the contextual word problems asked in the FET mathematics examinations of IEB and those of the National Senior Certificate? If any similarities exist, what are they?

(ii) How do FET mathematics students writing IEB mathematics examinations perform in the contextual word problems as compared to their counterparts in the National Senior Certificate mathematics examinations?

(iii) Does the context of a question pose any challenges to a student's ability to answer a mathematical problem?

2. Theoretical framework.

The theory of authentic task situations and the Realistic Mathematics Education (RME) perspectives are going to be taken in this study.

2.1 Mathematization of real life situations to form appropriate contextual word problems.

The theoretical basis for analysing the mathematization of real life situations to form appropriate contextual word problems is the theory of authentic task situations. The foundation of the theory is the assumption that if a performance measure is to be interpreted as relevant to a real life performance; it must be taken under conditions representative of the stimuli and reactions that occur in real life (Fitzpatrick and Morrison, 1971). For a school task to be authentic it must represent some task situation in real life and mathematize all important aspects of that situation to a reasonable degree of accuracy.

This theory criticizes school mathematics for not being genuinely realistic resulting in students not making proper use of their real world knowledge when solving contextual word problems. The way a real life task situation is mathematized determines the quality of the contextual word problem and consequently the student's response. Since it is impossible to mathematize all aspects of the real world, this theory specifies eight aspects of real life situations that are considered to be crucial in their mathematization. The eight, crucial aspects are event, question, information, presentation, solution strategies, circumstances, solution requirements and purpose in the figurative context.

These aspects determine the extent to which students may engage in the mathematical activities attributed to the mathematized situation. An authentic contextual word problem is one that sufficiently addresses all the eight crucial aspects. It is very difficult, if not impossible to mathematize all real world situations in such a way that the conditions for solving the contextual word problem will be exactly the same as those for solving the real world problem. The clarity of the mathematization of the eight aspects, the characteristics of the contextual word problems and the conditions under which they are to be solved can affect the magnitude of the difference between solving a real life problem and solving a contextual word problem.

This difference can in turn affect the similarities in the mathematics used and the degree of common sense applied in solving the contextual word problem. If the difference between solving a real life problem and solving a contextual problem is too big, students are more likely to display suspension of common sense.

2.2 Mathematics Teaching, Learning and Assessment.

The Department of Education (DoE) Curriculum Policy Statement (CAPS) of 2011 defines Mathematics as a human activity. Mathematics can also be defined as a science of concepts and processes that have a pattern of regularity and logical order. Alternatively, mathematics can also be defined as a process of making sense of abstract objects which relies on logic as it's standard of truth, (Van de Walle, 2011).

In this study, the Realistic Mathematics Education (RME) perspective will be taken to discuss mathematics teaching, learning and assessment. RME has its roots in Freudenthal's interpretation of mathematics as a human activity (Gravemeijer, 1994). Rather than being a subject to be transmitted, mathematics is student activities.

Since learning is the most important indicator of teaching, it is very difficult if not impossible to assess teaching without assessing learning. Learning mathematics is more effective if students learn mathematics through organising subject matter taken from reality as compared to rote learning. This can be achieved by giving students an activity similar to the invention of mathematics. Learning mathematics involves generating strategies for solving problems, applying these strategies, seeing if they led to solutions and checking to see if the answer makes sense.

The perception taken in this study is that mathematics was invented not discovered. Historically, mathematics evolved from the process of solving real life problems. Since mathematics emerged due to the practical needs of life, the source of learning mathematics is reality. Learning mathematics should model the act of using mathematics to solve real life problems thereby re-inventing the truth through observations, simulations and experimentation.

Whilst teaching mathematics requires effort by the teacher, learning mathematics requires effort by the student. The purpose of mathematics teaching needs to be enabling students to figure things out by testing ideas, making conjectures, developing reasons and offering explanations. Teaching mathematics needs to be student focused for it to be effective and sustainable.

For mathematics to be relevant to society and stay close to students' experiences, it should be based on real situations. Real situations include contextual problems and mathematical contexts in which students experience the problems presented as real. An important purpose of contextual word problems is the establishment of proper connections between mathematics as a discipline and real life situations.

Teaching and learning mathematics needs to provide students with guided opportunities to re-invent mathematics by doing it. Adequate teacher's content knowledge and appropriate methodology are both essential prerequisites for preparing students appropriately and for ensuring that they acquire the fundamental skill of mathematical proficiency (Sasman, 2011).

If students learn mathematics in an isolated fashion, divorced from their experiences, it will quickly be forgotten and they will not be able to apply it. Rather than starting with certain definitions to be applied later, a mathematics teacher may start with contexts that can be mathematized. To facilitate this, there is need to design classroom experiments that enforce a culture of mathematizing in students. For example students can learn about profit and loss by doing a project on selling stationary at school. Realistic Mathematics Education put emphasis on giving students problem situations they can imagine.

Learning mathematics is more than mastering a collection of concepts and skills. It includes methods of investigating and reasoning, means of communication and the notion of context. Since learning mathematics is like learning a language in another language (Kaphesi, 2001), mathematics can be regarded as a language which is predominantly taught in English in South Africa.

Mathematics achievement is generally not easy for home language speakers because of highly specialised mathematical terms with a variation of meanings from those used in everyday speech. According to Garegae, it is even more difficult for first additional language speakers because whilst their counterparts focus on learning only the specialised mathematical language they have to struggle with both the ordinary English language and the specialized mathematical language.

3. Methodology.

3.1 Research design.

Concurrent triangulation mixed methods research design.

The concurrent triangulation mixed methods research design was used for the research, (Gay, Mills and Airasian, 2006), since the problem statement contains a need to explore and to explain outcomes. Exploring requires qualitative methods and explaining outcomes requires quantitative methods. The researcher collected and analyzed data, integrated the findings, and drew inferences using both qualitative and quantitative methods in a single inquiry.

Both qualitative and quantitative data ware gathered simultaneously, merged using both qualitative and quantitative data analysis procedures, and the results interpreted together to provide a better understanding of past examination contextual word problems. The researcher developed the results and interpretations into information that sheds light on the nature and cognitive demands of contextual word problems asked in the FET examinations of IEB and those of NSC.

Qualitative and quantitative paradigms of the research were given equal status and were conducted concurrently (Johnson and Christensen, 2011 p 435). The researcher used the strengths of the quantitative method to offset the weaknesses of the qualitative method and the strengths of the qualitative method to overcome the weaknesses of the quantitative method in order to allow for a much stronger overall design and thus more credible conclusions.

Quantitative results enhance generalisation whilst on the other hand, qualitative results help to explain context. Consequently, the two methods resulted in complementary results. The mixing of qualitative and quantitative methods gave the researcher a better fix not only on the analysis of mathematics contextual word problems but also on the appreciation of them (Gorard and Taylor, 2004). The researcher converged and corroborated results from qualitative methods and quantitative methods in order to triangulate findings.

Jenkins did a triangulation mixed methods research on rural high school students' perceptions of drug resistance difficulties (Creswell and Plano Clark, 2007: 194-203). Jenkins analysed qualitative data obtained from focus groups, and quantitative data obtained using a semi-structured questionnaire, and merged the two data sets into an overall interpretation (Punch, 2009).

3.2 Population.

All contextual word problems in the NSC and IEB mathematics past examination question papers of 2008 – 2012.

3.3 Data collection.

Data was collected using the schedule for analysing the mathematization of real life situations and the schedule for the total marks of contextual word problems and national performance.

3.3.1 Schedule for analysing the mathematization of real life situations.

The schedule for analysing the mathematization of real life situations was modelled by the researcher on themes, significance, cognitive demands, subject of text and the eight crucial aspects of the theory of authentic task situations. This schedule has twelve columns and the number of rows depends upon the number of contextual word problems in the given question paper.

Table 1 - Schedule for analysing the mathematization of real life situations.

Question paper.	Marks and cognitive requirement.	Theme.	Subject of context.	Event.	Question.	Information (existence, realism, specificity).	Task presentation.	Solutions strategies.	Circumstances.	Solution requirements.	Purpose in figurative context.

The first column indicates the examination body, year, month and whether it is Paper 1 or Paper 2. The second column indicates the quantity of marks and cognitive requirements. The third column indicates the theme and the fourth column indicates the subject of context. The fifth column indicates whether the event described in the contextual word problem has taken place, has a fair chance of taking place or cannot take place in the real world

The sixth column indicates whether the question posed in the contextual word problem has a fair chance of being asked in a real world situation or not. The seventh column indicates the existence, realism and specificity of the information presented in the contextual word problem. The eighth column indicates the way the task is conveyed to students in terms of mode and language.

The ninth column indicates the role and purpose of someone solving the task in terms of availability and expanded plausibility. The tenth column indicates factors in the social context such as availability of extended tools, guidance, consultation and collaboration, discussion opportunities, time and consequences of task solving success or failure.

The eleventh column indicates solution requirements. The twelfth column indicates purpose in the figurative context. One schedule for analysing the mathematization of real life situations form was completed for each question paper resulting in a total of twenty schedules for analysing the mathematization of real life situations, ten schedules for IEB and ten schedules for NSC. The table below illustrates the respective columns of the schedule for analysing the mathematization of real life situations.

3.3.2 Schedule for the total marks of contextual word problems and national performance.

The schedule for the total marks of contextual word problems and national performance was adapted by the researcher from the quantity of marks of contextual questions in past examinations question papers and the national mathematics pass rate. One schedule for the total marks of contextual word problems and national performance was completed for both IEB and NSC. The schedule has six columns and eight rows.

Table 2 - Schedule for the total marks of contextual word problems and national performance.

Year.	**Total marks (IEB).**	**Average (%) (IEB).**	**Uptake (IEB).**	**Total marks (NSC).**	**National pass rate (NSC).**
2008	115	63,44	69,6	70	45,7
2009	104	63,98	67,7	80	46
2010	101	63,37	66,7	82	47,4
2011	74	63,94	66,1	69	46,3
2012	54	63,37	66,2	91	54
Total.	448	318,1	336,3	401	239,4
Average.	89.6	63,62	67,26	80,2	47,88

The total marks of contextual word problems for IEB has been declining from 2008 up to 2012, whilst the total marks of contextual word problems for NSC has been fluctuating from 2008 up to 2012. The total marks of contextual word problems in IEB examinations are higher than the total marks of contextual word problems in NSC examinations except in 2012.

3.4 Data Analysis.

Qualitative and quantitative data were analysed concurrently in an integrated fashion. Data mixing resulted in the combination of qualitative and quantitative data in order to communicate the essential characteristics of past examination contextual word problems and student performance. Datasets were merged through quantitative analysis of qualitative data and qualitative analysis of quantitative data using both descriptive statistics and inferential statistics. Qualitative data was presented numerically based on frequency of occurrence, which was then used in quantitative analysis. Statistical trends were complemented with qualitative data.

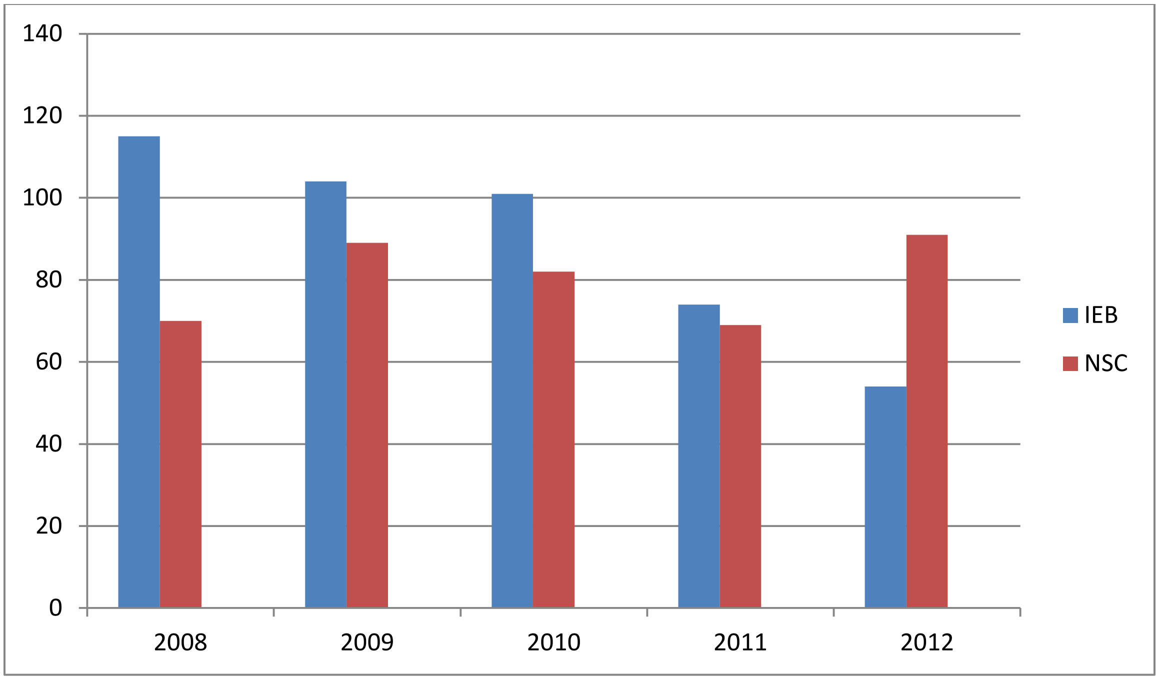
Moreover, essential characteristics of contextual word problems were also conveyed by arranging the data into a more interpretable form by forming frequency distributions, generating graphical displays such as bar graphs and calculating numerical indexes such as measures of central tendency and measures of dispersion.

Table 3 - Total marks of contextual word problems per year in ascending order.

Year (IEB).	Total marks (IEB).	Year (NSC).	Total marks (NSC).
2012	54	2011	69
2011	74	2008	70
2010	101	2009	89
2009	104	2010	82
2008	115	2012	91
Q1	64	Q1	69,5
Q2	101	Q2	82
Q3	109,5	Q3	90
IQR	45,5	IQR	20,5
Range	61	Range.	22
Mean.	89,6	Mean.	80,2
Standard deviation.	23,33	Standard deviation.	9,24

From the table above, the total marks for IEB contextual word problems is higher than the total marks for NSC contextual word problems, except in 2012.

Graph 1.



Total marks of contextual word problems per year.

From the bar graph above, the total marks for IEB contextual word problems has been declining from 2008 up to 2012, whilst, the total marks for NSC contextual word problems have been fluctuating from 2008 up to 2012.

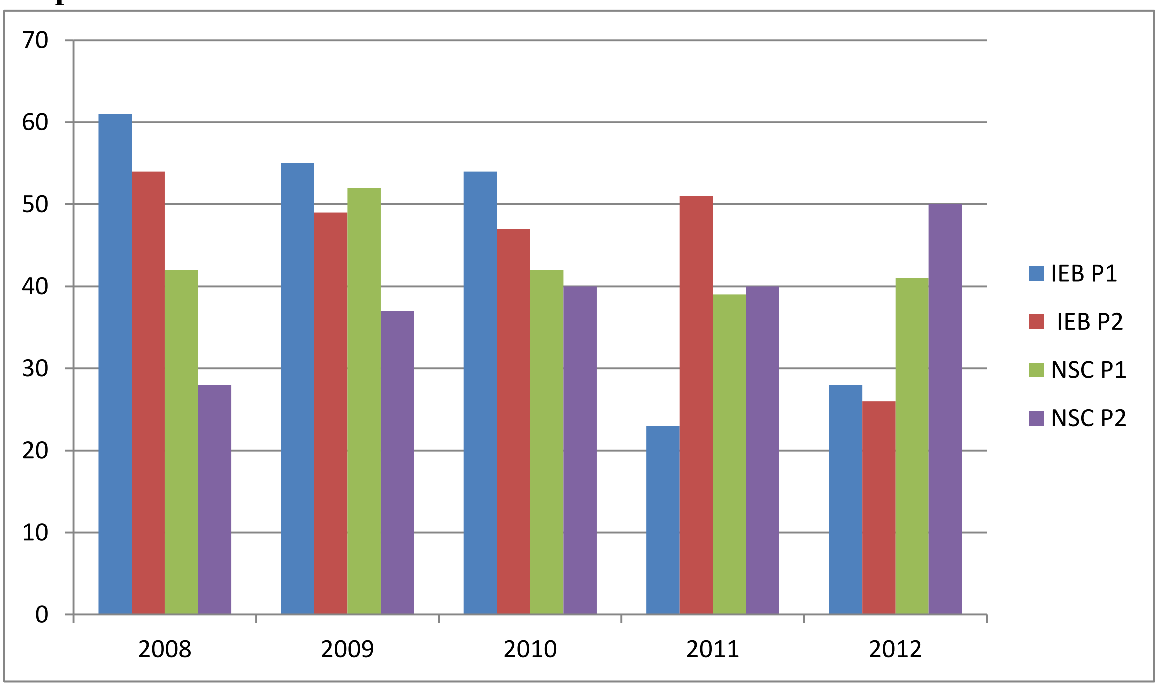
Table 4 - Total marks of contextual word problems for each question paper in ascending order.

Year (IEB)	Total marks (IEB)	Year (NSC).	Total mark (NSC).
2011 P1	23	2008 P1	28
2012 P2	26	2009 P2	37
2012 P1	28	2011 P1	39
2010 P2	47	2010 P2	40
2009 P2	49	2011 P2	40
2011P2	51	2012 P1	41
2008 P2	54	2008 P1	42
2010 P1	54	2010 P1	42
2009 P1	55	2012 P2	50
2008 P1	61	2009 P1	52

Mode.	54	Mode.	40,42
Q1	28	Q1	39
Q2	50	Q2	40,5
Q3	54	Q3	42
IQR	26	IQR	3
Range	38	Range.	24
Mean.	44,8	Mean.	40,1
Standard deviation.	13,06	Standard deviation.	6,28

From the table above, the total marks of contextual word problems for Paper 1 is higher than the total marks of contextual word problems for Paper 2 for both IEB and NSC examinations with the exception of 2011 for both examinations and 2012 for NSC examinations.

Graph 2



Total marks of contextual word problems per question paper.

From the graph above, the total marks of contextual word problems in all question papers in all examinations has been fluctuating from 2008 up to 2012.

Table 5 - Theme significance.

Theme (IEB).	Total marks (IEB).	Theme (NSC).	Total marks (NSC).

1. Sales, purchases, profit, loss, exchange rate and depreciation.	73	1. Sales, purchases, profit, exchange rate and depreciation.	62
2. Buildings, street lights, towers, walls, playhouses, roller coasters and stadiums.	66	2. Buildings, street lights, towers, walls, play houses, roller coasters and stadiums.	10
3. Academic marks.	40	3. Academic marks.	44
4. Age, height, weight and body mass index.	40.	4. Age, height, weight and body mass index.	10
5. Loans and investments.	32	5. Loans and investments.	35
6. Bridges and tunnels.	31	N/A	
7. Sport and recreation.	28.	6. Sport and recreation.	36
8. Maps, animals and physical features.	26	N/A	
9. Food and nutrition.	21	N/A	
10.Transport	17	7. Transport.	32
11. Logos.	16		
12. HIV	13		
13. Drinking glass, cans, water tanks, soccer balls, balloons and rectangular card box.	8	8. Drinking glass, cans, water tanks, soccer balls, balloons and rectangular cardboard.	31
14. Number of children per family.	8	N/A	
15. Satellites and missiles.	7	9. Satellites and missiles.	12
16. Earth’s orbit.	7	N/A	
17. Battery lifespan.	6	N/A	
18. Manufacturing and production.	5	10. Manufacturing and production.	46
19. Clock.	4	11.Clock	10
N/A		12. Sowing milies and sweet potatoes.	17
N/A		13. Rainfall.	15
N/A		14. Movement, distance, particle movement, water flow, time and speed.	41
Q1	7	Q1	12
Q2	17	Q2	31,5
Q3	32	Q3	44
IQR	25	IQR	32

Range.	69	Range.	52
Mean.	23.58	Mean.	28,64
Standard deviation.	19.5	Standard deviation.	15,9

From the table above, there are nineteen themes for IEB and there are fourteen themes for NSC.

Table 6 - Subject of texts.

Subject of text (IEB).	Total marks (IEB).	Subject of text (IEB).	Total marks (NSC).
1. Statistics.	117	1.Statistics	144
2. Financial Mathematics.	87	2. Financial Mathematics.	81
3. Trigonometry.	65	3.Trigonometry	41
4. Functions.	55	N/A	
5. Linear Programming.	39	4. Linear programming.	80
6. Number Patterns.	24	5.Number Patterns	12
7. Surface area and volume.	18	6.Surface area and volume	31
8. Calculus.	16	7. Calculus.	12
9. Transformation.	11	N/A	
10. Co-ordinate geometry.	9	N/A	
11. Circle – geometry.	7	N/A	
Q1	11	Q1	12
Q2	24	Q2	41
Q3	65	Q3	81
IQR	54	IQR	69
Range	110	Range	132
Mean.	40,73	Mean.	57,29
Standard deviation.	34,63	Standard deviation.	44,17

From the table, there are eleven subjects of context for IEB and seven subjects of context for NSC.

4. Conclusion.

In general IEB examinations have more themes and subjects of context as compared to NSC examinations. Be that as it may, the quantity of marks per theme and quantity of marks per subject of context for NSC examinations is generally higher than the quantity of marks per theme and quantity of marks per subject of context for IEB examinations.

The variation for IEB contextual word problems is greater than the variation of NSC contextual word problems. Since what is measured gets done, it might be necessary for curriculum documents to specify the quantity and nature of contextual word problems to be asked in FET examinations.

More IEB word problems are expressed in diagrammatic form as compared to NSC word problems. For trigonometry questions, IEB students are reminded to put their calculators in degree mode. Other colours besides black and white were used in IEB past examination question papers whilst NSC past examination question papers is predominantly black and white.

Topics which are examined in context are more likely to be taught and learned in context. Conversely, topics which are assessed using algebraic problems are more unlikely to be taught and learned in context. Since the examination is the ultimate motivation, examining a topic in context motivates teachers to teach that topic in context and learners to learn that topic in context.

Past examination contextual word problems are important inputs in the teaching and learning process. Teachers and subject advisors use past examination questions as bench marks in preparing questions for assessment for learning and assessment as learning. In addition, they are also important inputs in preparing questions for assessment of learning for continuous assessment marks (CASS). As a result past examination contextual word problems are an end in themselves as well as means to some ends. Context might be good, context might be bad but it is never irrelevant.

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